WHAT IS CLAIMED IS:

1. An apparatus for controlling an a. c. electric motor comprising:

current estimating means for receiving detected input d. c. currents from a power converter for converting d. c. power into a. c. power and a rotational phase which is obtained from a signal of detected position of the a. c. motor for outputting estimated current values of the a. c. motor on d- and q- axes of a rotational coordinate system of the motor;

d-axis current controlling means for controlling a d-axis current so that said estimated current value approaches a d-axis current instruction value; and

q-axis current controlling means for controlling a q-axis current so that said estimated current value approaches a q-axis current instruction value.

2. An apparatus as defined in Claim 1 and further comprising

speed operating means for receiving said input detected position signal for outputting a rotational speed of the a. c. current of said a. c. motor;

voltage vector operating means for outputting d- and q- axis first output voltage reference values based upon constants of said a. c. motor, said estimated current values and said rotational speed or

the constants of said a. c. motor, current instruction values and said rotational speed; and

adding means for adding signals output from said d-axis current control means and said q-axis current control means to the first output voltage reference value for outputting d- and q- axis second output voltage reference values.

3. An apparatus for controlling an a. c. electric motor comprising:

current estimating means for receiving detected input d. c. currents from a power converter for converting d. c. power into a. c. power and a rotation phase which is obtained from a signal of detected position of the a. c. motor for outputting estimated current values of the a. c. motor on d- and q- axes of a rotational coordinate system of the motor,;

d-axis current instruction operating means for controlling a first d-axis current so that said estimated current value approaches a first d-axis current instruction value to output a second d-axis current instruction value;

q-axis current instruction operating means for controlling a first q-axis current so that said estimated current value approaches a first q-axis current instruction value to output a second q-axis current instruction value; and

voltage vector operating means for receiving

a rotational speed obtained from said second d-axis current instruction value, said second q-axis current instruction value, said a. c. motor constants and said position detection signal for outputting d- and q- axis output voltage reference values.

4. A module comprising an apparatus for controlling an a. c. motor as defined in Claim 1 and a power converter for converting a direct current into an alternating current.

5. An apparatus for controlling an a. c. electric motor comprising:

motor current detecting means for detecting motor currents flowing through the a. c. motor for outputting the motor currents on d- and q- axis of a rotation coordinate system from said detected motor current values and a rotational phase instruction;

axial error operating means for receiving d- and q- axis output voltage reference values and said d- and q- axis motor currents for outputting a first phase error between said rotational phase instruction and the rotational phase of said a. c. motor;

subtracting means for receiving a position detection signal and said rotational phase instruction for outputting a second phase error;

combining means for receiving said first and second phase errors for outputting a third phase error therebetween;

frequency operating means for outputting a

frequency output from the power converter so that said third phase error approaches zero; and

phase instruction operating means for receiving said output frequency for outputting said rotational phase instruction.

6. An apparatus as defined in Claim 5 further comprising

speed operating means for outputting the rotational speed of said electric motor from said position detection signal; and

phase operating means for outputting the rotational phase from said rotational speed and said position detection signal,

said subtracting means being provided to output said second phase error based upon said rotational phase and said rotational phase instruction.

7. An apparatus as defined in Claim 5 further comprising q-axis inductance operating means for outputting a q-axis inductance value of said a. c. electric motor based upon said second phase error.

8. An apparatus as defined in Claim 7 in which said q-axis inductance operating means generates a tangential and cosine signals of said second phase error, divides said tangential signal by said cosine signal, then multiplies a quotient by a reciprocal of induced electromotive voltage constants of said a. c. electric motor, and dividing a product by a q-axis current instruction value or current estimate value for

calculating said q-axis inductance value.

9. An apparatus as defined in Claim 7 in which an operation is conducted using said q-axis inductance value in said axial error operating means.

10. An apparatus as defined in Claim 7 in which said output voltage reference value is operated using said q-axis inductance value.

11. An apparatus for controlling a permanent magnet synchronization motor as defined in Claim 7 further comprising q-axis current control means or q-axis current instruction operating means, control constants of said q-axis current instruction operating means or control constants of said q-axis current instruction operating means being changed using said q-axis inductance value.

12. An apparatus as defined in Claim 5 in which said motor current detecting means estimates said d- and q- axis motor currents from the detected input d. c. current values of said power converter.

13. A module comprising an apparatus for controlling an a. c. motor as defined in Claim 5 and a power converter for converting a direct current into an alternating current.

14. An apparatus for controlling an a. c. electric motor comprising:

motor current detecting means for detecting motor currents flowing through the a. c. motor for outputting the motor currents on d- and q- axis of a

rotational coordinate system from said detected motor current values and a rotational phase instruction;

axial error operating means for receiving d- and q- axis output voltage reference values and said d- and q- axis motor currents for outputting a first phase error between said rotational phase instruction and the rotational phase of said a. c. motor;

frequency operating means for outputting a frequency output from a power converter so that said first phase error approaches zero;

phase instruction operating means for receiving said output frequency for outputting said rotational phase instruction;

subtracting means for outputting a second phase error which is a difference between said rotational phase instruction value and the rotational phase which is obtained from a position detection value of said a. c. motor; and

q-axis inductance operating means for calculating the constants of said a. c. motor from said second phase error.

15. An apparatus as defined in Claim 14 in which said motor current detecting means estimates said d- and q- axis motor currents from the detected input d. c. current values of said power converter.

16. A module comprising an apparatus for controlling an a. c. motor as defined in Claim 14 and a power converter for converting a direct current into an

alternating current.

17. A method of controlling an a. c. electric motor comprising the steps of:

estimating currents flowing through said a. c. motor on d- and q- axis of a rotational coordinate system based upon detected d. c. current values input to a power converter which converts a direct current into alternating current and a rotational phase which is obtained from a position detection signal of said a. c. motor;

controlling a d-axis current so that said estimated current value approaches a d- axis instruction value; and

controlling a q-axis current so that said estimated current value approaches a q-axis instruction value.

18. A method as defined in Claim 17 further comprising the steps of:

operating and outputting a rotational speed of said a. c. motor based upon said position detection signal;

operating voltage vectors for outputting d- and q- axis first output voltage reference values based upon constants of said a. c. motor, said estimated value and said rotational speed, or the constants of said a. c. motor, a current instruction value and said rotational speed; and

calculating d- and q- axis second output

voltage reference values by adding the signals output at said steps of controlling said d- and q- axis currents to said first output voltage reference value.